The ACWI endorses the continued development of NEMI as a vital tool to enhance the generation of comparable data of known quality, across all entities that conduct water quality monitoring. Use of NEMI will assist in the design of water quality monitoring programs, so that data quality objectives and measurement quality objectives are more readily achieved.

NWQMC NATIONAL WATER QUALITY MONITORING COUNCIL

Methods and Data Comparability Board

Overview of Methods Board Activities

Advisory Committee on Water Information
Reston, VA
May 16, 2001

Objectives of Presentation

- Describe product based approach
- Discuss resources
- Describe Methods and Data Comparability Framework
- Describe impact of emerging technologies
- WQDE and NEMI discussed previously
- Focus on accreditation, PBMS pilot, biology, nutrients
- Use of FACA authority to make recommendations to Federal agencies

So please don't leave,

to do business...

of any kind...

Guiding Principle

Deliver products in the short term while thinking and planning strategically in the long term

Product Based Approach

- Need to generate intermediate and final products and demonstrate success
- Prioritize longer term product activities
- Organize meetings to focus on product accomplishments
- Not attempt more than can be accomplished
- Continue to involve additional volunteer stakeholders
- Integrate project and program activities
- Publicize what we do

Resource Issues (FTE, $)

- Available resources will, in part, determine accomplishments
- USGS and EPA funds are limited
- Volunteer organizations have committed salaries
- Need additional funding to maintain momentum

Innovative Resource Approaches

- Pursue funding from other Federal Agencies
- Established CRADA for COD pilot study and may use mechanism for other pilot studies
- DOE contract and other support for NEMI design assessment and Phase 1 and 2
- Standard Methods and ASTM support for NEMI Phases 2 and 3
- WERF grant for comparing field bioassessme[illegible] and WET results

eyecatch.exe

Methods and Data Comparability Framework

Element	Description	Relevant MDCB Activities *Future activity planned
DQO/MQO Development-Definition	• Sampling design • Data quality • Study objectives • Monitoring question	• DQO paper* • Nutrient pilot* • PBMS paper • COD Pilot • NEMI
Sample Collection Field Method Performance	• Field sampling methods • Sample handling/preservation • Training	• Field Biological PBMS Paper • Macroinvertebrate Pilot* • Nutrient Pilot*
Laboratory Analysis Performance	• Lab Accreditation • Reference Materials Available • Lab Method Verification	• Federal Lab Accreditation Paper • Coordination with NELAC • PBMS Paper • COD Pilot
Data Reporting	• Required metadata • Data quality documentation	• Water Quality Data Elements (WQDE) • National Environmental Methods Index (NEMI)

Impact of New Technologies

- For methods and data comparability
- In the context of workgroup activities

Why are new technologies of interest?

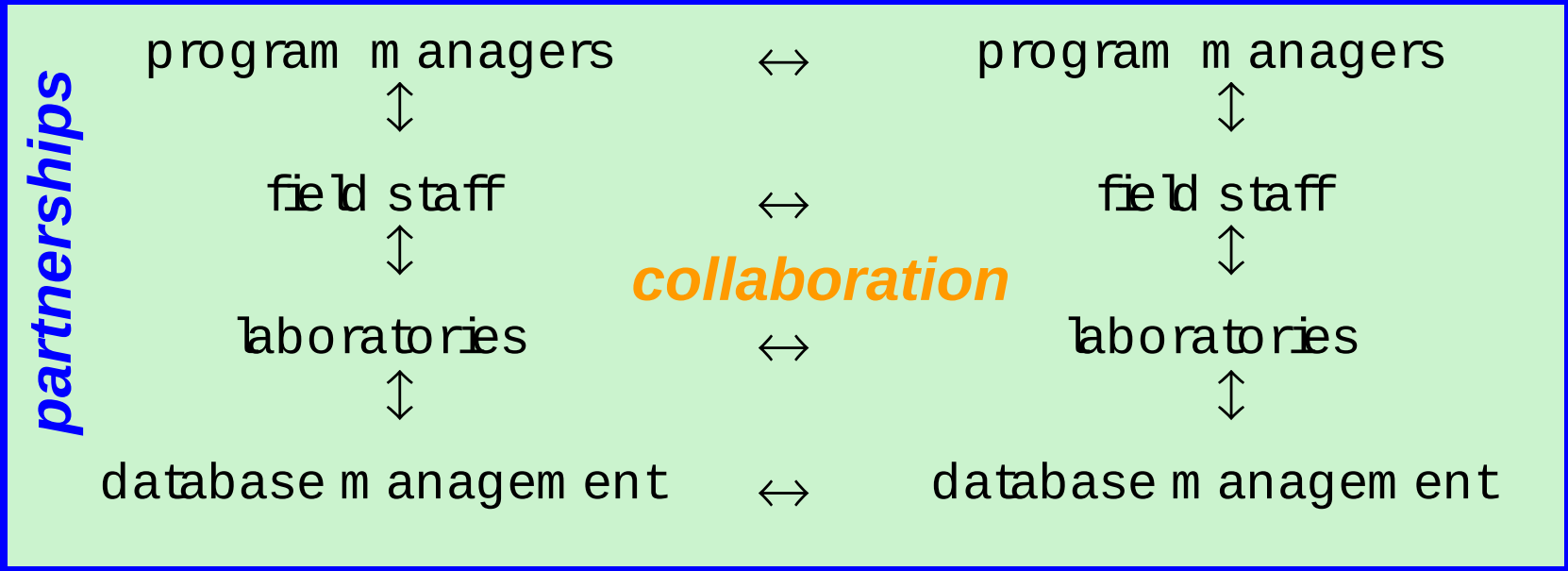
- **Improve data quality**
  (*increase specificity, sensitivity, precision, accuracy*)
- **Reduce cost of sampling and analysis**
  (*materials for sample collection and analysis; time in field; time of sample preparation and analysis; time to report results; labor*)
  → increase data quantity (*representativeness, completeness*) → improve data quality
- **Bottom line:** potential to improve protection of ecological and human health

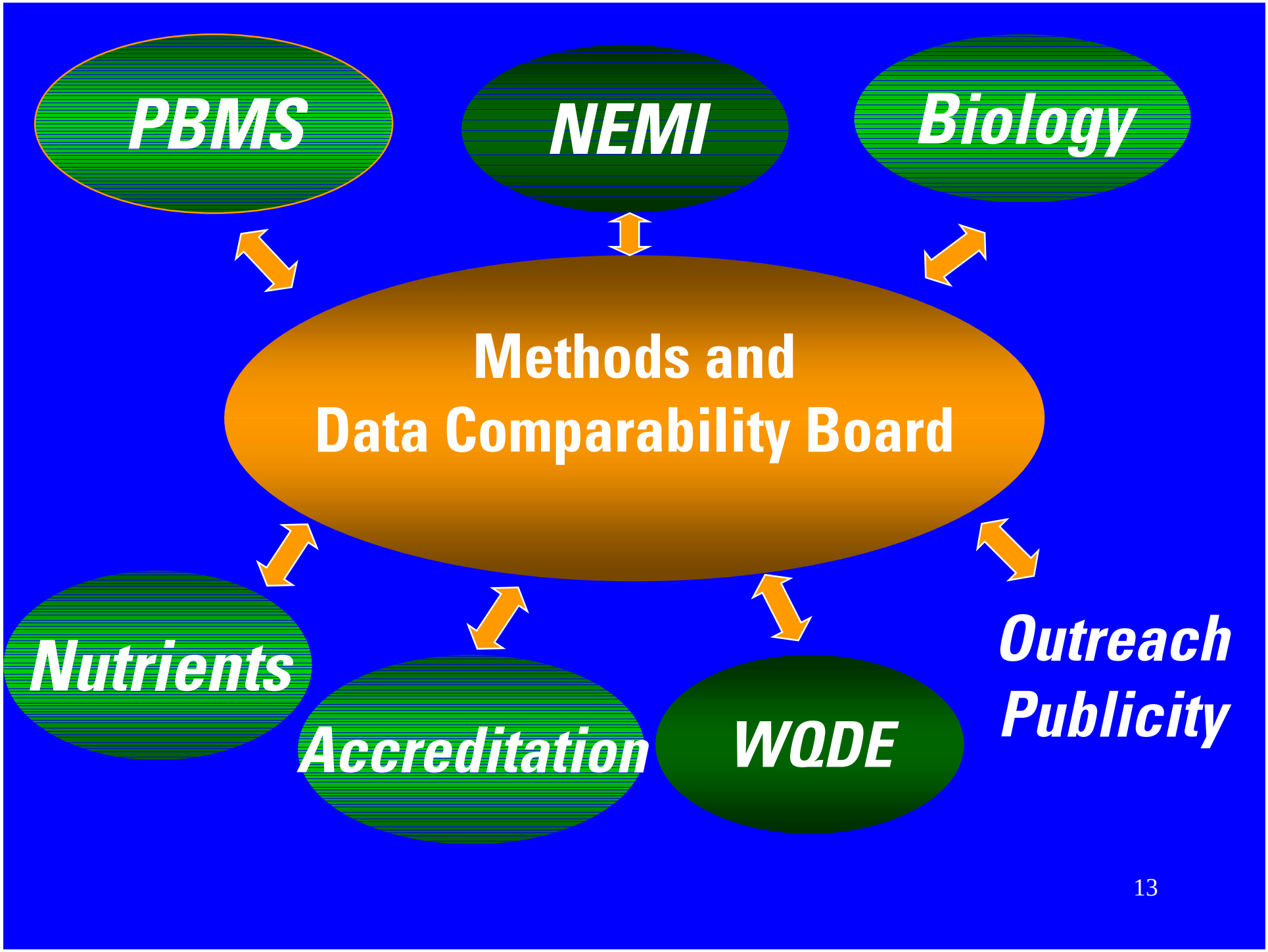
Reality of New Technologies

Different methods used at different times, by different programs with different DQOs/MQOs

change is constant (!)

How to achieve data comparability?




PBMS
NEMI
Biology
Methods and
Data Comparability Board
Nutrients
Accreditation
WQDE
Outreach
Publicity

Accreditation

Harold Ardourel, Bart Simmons Workgroup
Co-Chairs

Accreditation Workgroup Representation

- USGS
- CA Dept Toxic Sub
- Eastman Chemical
- AZ Dept Health
- Tetra Tech
- Montgomery Watson
- Standard Methods
- USDOD (Navy)
- CMA
- Catalyst

The Goal

To identify the need for accreditation and a national accreditation program best suitable to federal agencies (labs) doing analytical water testing

Accreditation Paper Schedule

- ~~Receive final review comments – 10/25/00~~
- ~~Incorporate review comments – 11/10/00~~
- ~~Review by NVLAP, A2LA, NELAC - 12/8/00~~
- ~~Obtain Board review/approval – 1/9/01~~
- ~~Obtain National Council review/approval – 2/7/01~~
- *Obtain ACWI review/approval – 5/16/01*
- Present NELAC – 5/22/01

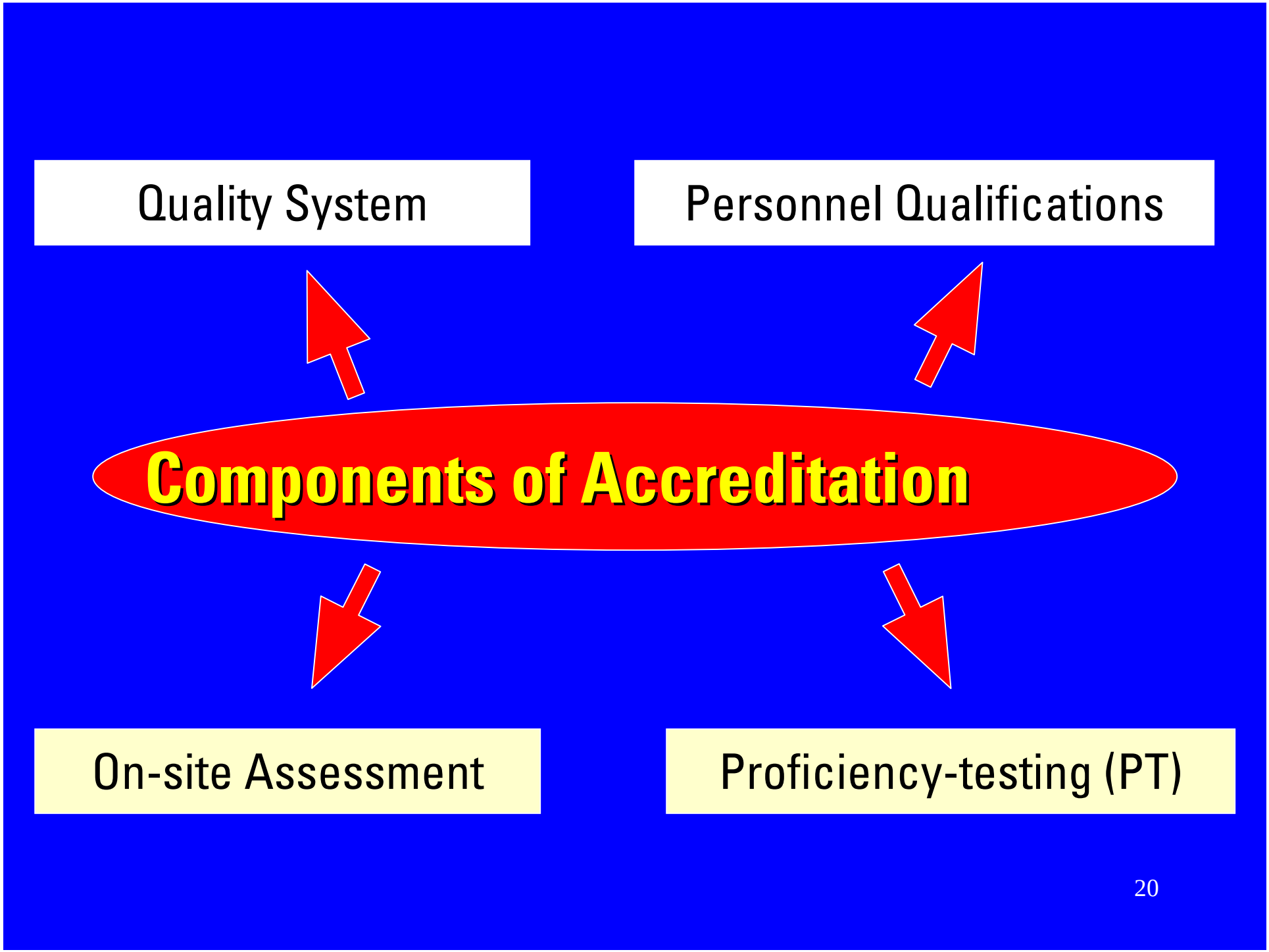
Accreditation

" A procedure by which an authoritative body gives formal recognition that a body or person is competent to carry out specific tasks"

--ISO/IEC 58

Accreditation (contd.)

Uniform accreditation is considered a key component in promoting generation of data of known quality suitable for data comparability issues among users.


Quality System
Personnel Qualifications
Components of Accreditation
On-site Assessment
Proficiency-testing (PT)

Issues considered by the workgroup

- ✓ What is the scope of work performed by federal agencies doing water-testing?
- ✓ Identify National Accreditation Programs suitable for federal water-testing laboratories

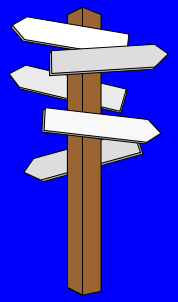
Issues considered by the workgroup

- ✓ Identify Accreditation Standards incorporated by most of the Accreditation Programs

- ✓ Identify a list of key elements in an Accreditation Program that would be desirable for meeting federal agency needs and to compare the ability of the identified Accreditation Programs to meet these elements

What is the scope of work done by federal agencies?

- USGS, EPA, ACOE, Navy, NPS, and DOE were examined as representative of most federal labs doing water testing



  - Most are engaged in ambient, regulatory monitoring or research activities as major or minor activities

  - Analyze a wide range of parameters (Inorganic, Organic, Biological, Radiochemical)

National Accreditation Programs suitable for federal agencies doing water testing?

- ✓ NELAP (National Environmental Laboratory Accreditation Program
- ✓ A2LA (American Association for Laboratory Accreditation
- ✓ NVLAP (National Voluntary Laboratory Accreditation Program)

Conclusions from Accreditation Program Comparison

- ✓ NELAP when fully implemented offers more advantages to federal laboratories than either A2LA or NVLAP
  - -- Only NELAP addresses uniform, national reciprocity issues
  - -- Only NELAP offers federal accrediting authority
  - -- Provides uniform national standards to replace multiple accreditation standards and programs.

Recommendations

1

All federal agencies (and commercial laboratories employed by federal agencies) performing analytical water testing, as part of compliance or ambient monitoring programs, should be accredited under a recognized program, in order to better establish comparability of data

Recommendations (contd.)

2

The National Environmental Laboratory Accreditation Program (NELAP) is the Board's recommended program, because NELAP adequately meets (or is taking measures to meet) the broad needs of the majority of federal laboratories performing water testing

Recommendations (contd.)

3

For NELAP to serve as a satisfactory accrediting program for federal laboratories, NELAP needs to continue its efforts to:

- Obtain more state participation and reciprocity
- Address standards for ambient monitoring, field sample collection, and field measurements
- Promote the development of PBMS implementation

Recommendations (contd.)

4

Federal agencies should consider seeking to become an accrediting authority for their own laboratories under NELAP

Accreditation Issues/Next Steps

- Examine accreditation issues beyond federal laboratories (field and laboratory)
- Continue liaison to NELAP with respect to MDCB efforts
  - Incorporation of Water Quality Data Elements into NELAC standards
  - Development of sampling standards
  - Development of field measurement standards
  - Incorporation of PBMS into NELAC standards

Performance Based Systems (PBMS)

Cliff Annis, Workgroup Chair
(succeeds Andy Eaton)

PBMS Workgroup Representation

- Montgomery Watson
- Standard Methods
- USEPA
- Tetra Tech
- CA Dept Toxic Sub
- DE River Basin Co
- HRSD
- NOAA
- CMA
- Merck
- Instant Ref. Sources
- ASTM
- USGS
- USCOE
- Catalyst
- Hach Co.

What is PBMS

A performance based system permits the use of any scientifically appropriate method that demonstrates the ability to meet established performance criteria and complies with specified data quality needs or requirements

The Methods Board Developed A White Paper in Late 1999

- Defined PBMS and its requirements
- Recognized several current challenges to implementing a PBMS
- Presented to ACWI in 1999
- Recommended several activities to address challenges, including pilot studies

Board Developed PBMS Pilot to Address Several Challenges

- ACWI concerns regarding implementation of PBMS.
- Required documentation of data quality generated by labs using new or modified methods
- Differences in PBMS implementation and laboratory requirements depending on the type of PBMS approach used
- Implementation requirements depending on the type of lab (e.g. wastewater facility lab vs. commercial lab)

What Was Examined In This Pilot?

- Two approaches to PBMS:
  - Reference Method Approach: compare results of new method to those of the approved (reference) method
  - Measurement Quality Objective (MQO) Approach: compare method performance to stated MQOs
- Initial demonstration that lab is capable of using methods

What Was Examined In This Pilot? *Cont'd*

- Analyses of methods using representative wastewater samples
- Two methods for chemical oxygen demand (COD) examined:
  - Approved reference method (Hach 8000)
  - New Hach method (10125)

Additional Aspects of Pilot

- Determining reasonable and appropriate analysis requirements for laboratories using a new or modified method is a major obstacle of implementing PBMS
- Current approved COD method generates hazardous waste (mercury, hexavalent chromium). New method is more environmentally friendly
- Method-dependent parameters like COD are currently problematic from a PBMS standpoint

Pilot Was A Collaborative Effort

- Method Developer (Hach Co.)
- Federal labs (EPA Regions 2 & 3, USGS)
- Private commercial labs (Montgomery Watson)
- State labs (Oregon)
- Facility labs (Phoenix, Hampton Roads, United Sewage)
- Eight participating labs, plus many more expert reviewers, data analysts, and data auditors
- CRADA signed by all participants

What Did the Pilot Show?

- Analyses of actual samples (matrices) are critical to success of a PBMS
- Very different results are obtained depending on the type of PBMS used -- fewer labs met the MQO approach as compared to the reference method approach
- Lab performance of the approved (reference) method should be documented in any PBMS
- Labs did not always obtain satisfactory results using the approved method

Additional Considerations

- Addressed implementation questions
  - *How do labs ensure that new or modified methods are used appropriately?*
  - *How do different types of PBMS differ in terms of their indication of data quality?*
- Produced report and submitting peer-reviewed journal article
- Additional pilots planned
  - Nutrient sampling and analysis
  - Biological field method

Biological Methods

Chris Ingersoll, Mike Miller,
Katherine Alben, and Donna Francy
Workgroup Co-Chairs

Biology Measurements Workgroup Representation

- EBMUD
- USGS
- NY Health Dept
- SUNY
- WI DNR
- OH EPA
- HRSD
- Exxon Biomedical
- ASTM
- Tetra Tech
- USEPA
- KY Div of Water
- USDA - FS
- USDA - NRCS
- VA DEQ
- DE River Basin Co
- University California (Berkley)

Characterizing Performance of Field Biological Methods

- Formed Field Focus Group to assist Board: experts from state, university, federal, and private sector
- Produced White Paper on characterizing field method precision – submitted to peer-reviewed journal
- Developing White Paper on characterizing field method accuracy
- Working with EPA's Biological Advisory Committee on documenting performance characteristics and water quality data elements

Determining Comparability of Field Methods

- No methods are currently available to evaluate comparability of field methods: A framework is needed.
- Designing pilot comparing stream benthic macroinvertebrate field methods to help develop a framework
- Compiling information on previous biological comparability studies

Determining Comparability of Field Methods

- Providing a compendium of field methods for NEMI
  - Provide performance information where available
  - Aid users in selecting appropriate biological methods depending on monitoring objective

Providing Peer Review of Data Quality Objective Study for Water Environment Research Foundation

- Comparing field bioassessment and whole effluent toxicity results
- Using DQO approach to set measurement quality objectives and define appropriate study methods
- Uses method performance information compiled by Board
- Linking with EPA's Biocriteria Workgroup and EPA Biological Advisory Committee

Nutrient Methods and Related Issues

Ed Santoro and Ron Jones
Workgroup Chairs

Nutrient Workgroup Representation

- DE River Basin Co
- FL Int Univ.
- NY Health Dept
- WI DNR
- EPA OW
- USGS WI District
- VA DEQ
- ASTM

Nutrient Methods

- Compiled performance information for 44 nutrient methods
- Compared performance information provided by several organizations: ASTM, Standard Methods, EPA, and USGS
- Produced report summarizing comparability analyses
- Many differences observed in documenting performance among organizations; many performance characteristics not documented

Comments on Nutrient Criteria Strategy

- Reviewed EPA nutrient criteria guidance documents
- Objective is to provide constructive input to criteria development
- Providing comments to National Council
- To be discussed at June 4-8 National Council and Methods Board meeting.

Outreach and Publicity

Rick Dunn and Cliff Annis

Workgroup Chairs

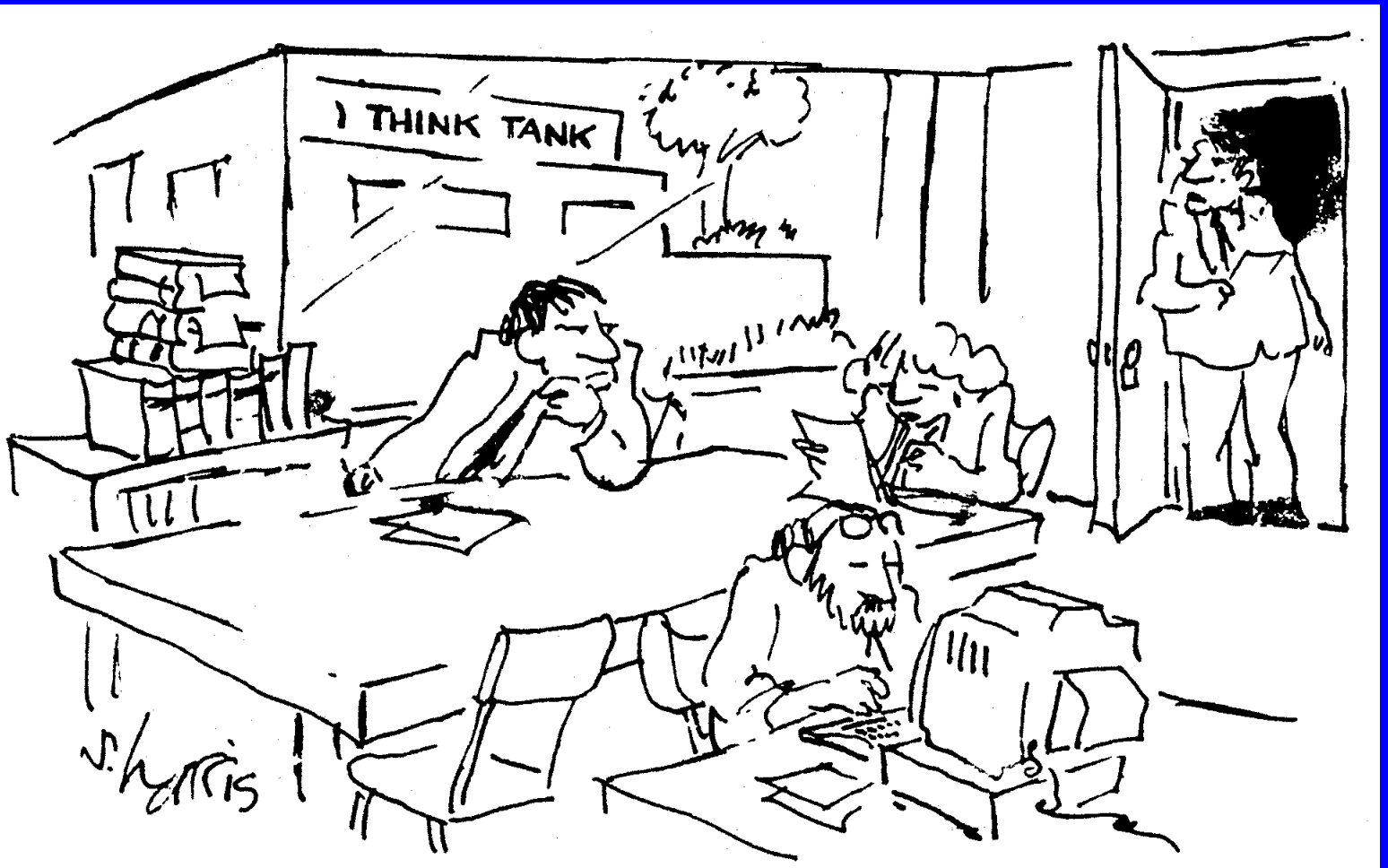
Outreach Workgroup Representation

- EBMUD
- SMi
- USGS
- NY DOH
- DRBC
- Argonne Lab
- Tetra Tech
- USEPA
- Workgroup Chairs
- Hach
- Merck
- Standard Methods

http://wi.water.usgs.gov/pmethods/

Requests of ACWI

- Endorse MDCB Recommendations
- Use of FACA Authority to Make Recommendations to Federal Agencies
  - Water Quality Data Elements
  - Accreditation of Federal Laboratories
  - NEMI
- Recommendations must be in concert with stakeholder community



"Our funding runs out in a month. Will everyone please think a little faster?"